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and this leaves, as residual errors,

			C—O. ″	
Bradley			0·0	
Piazzi	1805		(+0·8)	
Pond	1813		(−0·6)	
Bessel	1820		−0·6	
Pond	1822	(Olufsen)	+0·3	
Struve	1824		+0·4	
Pond	1826		(+0·8)	
Argelander	1830		−0·5	
Taylor	1832		+0·2	
Henderson	1833		0·0	
Pond	1833		+1·1	(14 observations.)
Airy	1834		+1·0	
Maclear	1834		+0·3	
Henderson	1837		−0·4	
Airy	1838		−0·5	
Busch	1838		−0·4	
Bessel	1843		+0·5	
Airy	1844		0·0	
,,	1850		−0·4	
Moesta	1855		+0·5	
Airy	1856		−0·4	

There can be hardly any doubt, then, that Bessel's and Peters' hypothesis does actually represent the observed Declinations of *Sirius*, although the evidence on which it has been previously urged depends entirely on the Right Ascensions.

It may be noticed that Calandrelli's statement, that the *Greenwich Twelve-Year Catalogue* for 1845 (1844) is materially in error, is at once refuted by the almost perfect agreement given above. The phenomena which *Sirius* presented about 1841, that being according to Peters (confirmed by the results above) the time of the passage of the lower apside, are sufficiently remarkable; rapid variations both in Right Ascension and Declination were then taking place.

Extract of a Letter from Mr. A. Auwers to the Rev. R. Main, dated Königsberg, 1862, February 21, on the Irregularity of the Proper Motion of Sirius, and on a Missing Nebula.

(*Communicated by the Rev. R. Main.*)

For some months I have been attempting to represent the observed Declinations of *Sirius* from 1755 to 1859, in which a

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periodical change of proper motion is very conspicuous, by a formula grounded on the elements of Peters; and I found the correction q' of the declinations of the *Tabulæ Regiomontanæ*, relatively to β *Orionis* and α *Hydræ*, from thirty-one equations,

$$q' = +0''\cdot10 + 0''\cdot0158\,(t-1800) + 1''\cdot536\sin u - 0''\cdot025\cos u,$$

where

$$u - 0''\cdot7994\sin u = 7^\circ\cdot1865\,(t-1791\cdot431),$$

The values of q' from the *Greenwich Six-Year Catalogue*, and from the observations from 1854 to 1859, are

$$-0''\cdot14,\ +2''\cdot36,\ +2''\cdot51,\ +2''\cdot65;$$

the elements give for these epochs

$$-0''\cdot66,\ +2''\cdot14,\ +2''\cdot36,\ +2''\cdot03,$$

and therefore completely justify your defence of the Greenwich declinations against the objections of Calandrelli.

It has only very recently been known to me that Mr. Safford has made a similar investigation, using, however, different stars of comparison. If the corrections q' of the declinations of *Sirius* be deduced from the formula given above, and from that communicated in No. 28 of the *Astronomical Notices*, we obtain:—

According to Safford,

$$q_{\prime}' = -1''\cdot00 + 0''\cdot0104\,(t-1800) + 1''\cdot47\sin u + 0''\cdot51\cos u$$

According to my calculation,

$$q_{\prime}' = -0''\cdot60 + 0''\cdot0003\,(t-1800) + 1''\cdot536\sin u - 0''\cdot025\cos u$$

a satisfactory agreement with reference to the materials employed. This in fact is not unexceptionable, the probable error of a determination of declination being, according to Safford, ± 0''·30, and according to me, ± 0''·32, while at the same time I have found for *Procyon* an orbit, which represents the observed places with the probable errors ± 0''·17. The reason of the lesser agreement of the Declination of *Sirius* arises plainly from the circumstance that this star for European Observatories culminates at too low an altitude. For a new determination of the elements of its orbit from all the observed Right Ascensions and Declinations, which I contemplate undertaking, determinations of southern Observatories would be very desirable. Is it known to you whether the observations of the Cape of Good Hope since 1834 are reduced?

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I observed several times in February and March, 1858, the interesting Nebula found by Hind in 1852, and observed by D'Arrest and Breen in 1855 and 1856, and finally missed by D'Arrest in October 1861. In 1858 I found it to be fainter than it ought to have been, according to the description of D'Arrest in 1855. At that time I saw it with a telescope of $4\frac{1}{3}$ inches aperture, but, in January and September 1861, I could not find it with the 6-inch heliometer, nor have I been able to find it after repeated searches during the last five months. The variability of the accompanying star I remarked in November 1861, as I found it to be of the 11–12 magnitude, while in 1858 it was of the 10th magnitude. At present it appears to be getting somewhat brighter, and is of the 11th magnitude.

Extract of a Letter from Mr. A. Auwers to the Rev. R. Main, dated Königsberg, 1862, March 21, on the Orbit of Procyon, and on the Positions of the Radcliffe Catalogue.

(*Communicated by the Rev. R. Main.*)

I am much obliged for your answer to my letter of the 21st of February. Learning from your letter that the results of my researches on variable Proper Motions may perhaps be interesting to you, I add to the formula for correcting the tabular Declinations of *Sirius*, given in my preceding letter, also the elements of the orbit of *Procyon*, derived from all available observations of Right Ascension and Declination, made between 1750 and 1860:—

Epoch of minimum in R.A.	$=T$	$1795{\cdot}5676$	Probable error		$\pm 0^{y}{\cdot}4457$
Time of revolution	$=U$	$39^{y}{\cdot}972$	„	„	$\pm 0^{y}{\cdot}4043$
Mean yearly motion	$=n$	$9^{\circ}{\cdot}00634$	„	„	$\pm 0^{\circ}{\cdot}09110$
Radius of circle	$=r$	$1''{\cdot}0525$	„	„	$\pm 0''{\cdot}0275$

There is not the least trace of ellipticity indicated by the observations. The corrections to be applied to the Right Ascension of Wolfers' *Tabulæ Reductionum*, relative to the mean of the stars *Aldebaran*, *Rigel*, *α Orionis*, *Pollux*, *α Hydræ*, and *Regulus*, and to the Declination of the same tables, relative to *α Ceti*, *α Orionis*, *α Serpentis*, *γ*, *α*, *β Aquilæ*, and *α Aquarii*, are the following:—

$$d\alpha = +0^{s}{\cdot}0033 \;-0^{s}{\cdot}001192\;(t-1830)\;-0^{s}{\cdot}0705\cos n\,(t-T),$$

$$d\delta = +0''{\cdot}201 \;+0''{\cdot}00931\;(t-1830)\;+1''{\cdot}853\;\sin n\,(t-T).$$